

SLEET.

Description of the more severe sleetstorms of the month is given under "Local Storms."

Sleet was reported as follows: 1st, South Dakota. 2d, Iowa and South Dakota. 3d, Arkansas, Illinois, Kansas, Kentucky, Michigan, Mississippi, Missouri, Nebraska, New Jersey, and Virginia. 4th, Alabama, Missouri, Nevada, North Carolina, South Carolina, and Virginia. 5th, California and Nevada. 6th, Missouri and Washington. 7th, California, Nebraska, Oregon, and Washington. 8th, Arizona, Illinois, Iowa, Kentucky, Minnesota, Nebraska, and Washington. 9th, Arizona, Colorado, Indiana, Minnesota, Nevada, Utah, Washington, and Wisconsin. 10th, Minnesota, Nebraska, North Dakota, South Dakota, and Texas. 11th, California, Iowa, Michigan, Nevada, New York, North Dakota, Oregon, and Utah.

12th, California, Michigan, Montana, New Hampshire, North Dakota, and Washington. 13th, Colorado, Iowa, Minnesota, Nebraska, and South Dakota. 14th, Illinois, Michigan, New York, and Virginia. 15th, Maine and Nevada. 16th, Alabama, Arkansas, Florida, Louisiana, and Missis-

issippi. 17th, Arkansas, Georgia, Kentucky, Mississippi, Nevada, South Carolina, Tennessee, Virginia, and Washington. 18th, Alabama, Mississippi, Oregon, South Carolina, Virginia, and Wisconsin. 19th, Montana, Ohio, South Dakota, and Utah. 20th, Colorado, Georgia, Nevada, South Dakota, and Wisconsin. 21st, Iowa, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New York, and Utah.

22d, Colorado, Illinois, Iowa, Michigan, Minnesota, Nebraska, Nevada, New Jersey, New York, Ohio, Pennsylvania, South Dakota, and Wisconsin. 23d, Connecticut, Iowa, Maine, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, South Dakota, Utah, and Wisconsin. 24th, Connecticut, Illinois, Maine, Michigan, Minnesota, Mississippi, Nebraska, Oregon, and Washington. 25th, Colorado, Minnesota, Nebraska, Ohio, and Utah. 26th, Colorado, Indiana, South Dakota, and Utah. 27th, Kansas, Missouri, Montana, Nebraska, North Carolina, and Oregon. 29th, Georgia and Washington. 30th, Massachusetts and New York. 31st, Colorado, New York, South Dakota, and Utah.

WINDS.

The prevailing winds in March, 1893, are shown on Chart II by arrows flying with the wind. In New England the winds were generally from west to north; in the middle Atlantic states and on the middle-eastern slope of the Rocky Mountains, from the northwest; in the west Gulf states, from southeast to south; in the Ohio Valley and Tennessee, from south to southwest; in the lower lake region, the extreme northwest, the Missouri Valley, and over the southern plateau region, from west to northwest; in the upper lake region and upper Mississippi valley, from northwest to north; on the southeast slope of the Rocky Mountains, from south to west; over the middle plateau region and along the north and middle Pacific coasts, from southeast to southwest; over the northern plateau region, from the south; and in the south Atlantic and east Gulf states, over the Florida Peninsula, on the northeast slope of the Rocky Mountains, and along the south Pacific coast, variable.

HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows: 2d, 51, nw., at Woods Holl, Mass. 3d, 60, e., at Tatoosh Island, Wash. 4th, 60, n., at Kittyhawk, N. C.; 56, nw., at Hatteras, N. C.; 50, nw., at Galveston, Tex.; 50, e., at Tatoosh Island, Wash. 7th, 60, s., at Fort Canby, Wash. 8th, 55, se., at Chicago, Ill. 9th, 56, sw., at Amarillo, Tex.; 54, ne., at Block Island, R. I. 10th, 72, s., at Fort Canby, Wash.; 60, ne., at Block Island, R. I.; 60, nw., at Kearney, Nebr.; 56, nw., at Colorado Springs, Colo.; 52, nw., at Valentine, Nebr.; 50, sw., at Amarillo, Tex.; 50, e., at Tatoosh Island, Wash. 11th, 66, s., at Fort Canby, Wash.; 52, nw., at Kearney, Nebr.; 51, se., at Keeler, Cal.; 50, nw., at Valentine, Nebr. 12th, 85, w., at Pikes Peak, Colo.; 58, sw., at Amarillo, Tex.; 54, nw., at Colorado Springs, Colo. 13th, 50, nw., at Colorado Springs, Colo. 14th, 54, e., at Tatoosh Island, Wash. 15th, 90, sw., at Pikes Peak, Colo.; 50, se., at Amarillo, Tex. 16th, 50, nw., at Block Island, R. I. 17th, 61, e., at Tatoosh Island, Wash.; 56, se., at Fort Canby, Wash. 18th, 92, w., at Pikes Peak, Colo.; 50, s., at Amarillo, Tex. 21st, 56, sw., at Amarillo, Tex. 22d, 60, sw., at Amarillo, Tex.; 56, ne., at Chicago, Ill.; 50, sw., at Abilene, Tex. 24th, 56, sw., at Chicago, Ill.; 54, w., at Columbus, Ohio. 27th, 52, s., at Fort Canby, Wash.; 50, sw., at Key West, Fla. 31st, 82, sw., at Pikes Peak, Colo.; 66, s., at Fort Canby, Wash.; 57, nw., at Colorado Springs, Colo.

LOCAL STORMS.

3d.—In the evening severe local storms occurred in the east Gulf states. The more destructive storms of this group visited Lauderdale and Clarke counties, in extreme east-central Mississippi, about 6 p. m., the adjoining counties of Sumter and Choctaw, in Alabama, between 6.30 and 7 p. m., and Troup, Meriwether, Pike, and northern Upson counties, in extreme west-central Georgia, between 8.30 and 9 p. m. At Vicksburg, Miss., a thunderstorm, with rain and hail, began 5 p. m. and ended 5.40 p. m. (75th meridian time). At Meridian, Miss., a thunderstorm, with rain, began 7.48 p. m. and ended 8.17 p. m. (75th meridian time); from 6.50 to 7.05 p. m. the wind was high from the southwest. At Toomsuaba, Lauderdale County, Miss., a funnel-shaped cloud moved eastward in a path 250 to 300 yards in width about 6 p. m., attended by heavy thunder, vivid lightning, heavy rain after, and small hail. Articles were carried up in the funnel, and property was destroyed to the estimated value of \$30,000 to \$40,000.

At Pachuta, Clarke County, Miss., a storm moved southeast in a path about 200 yards in width, with heavy rain during and after, continuous vivid lightning, and some hail. One person was killed; trees were torn up by the roots or twisted off, and were piled in and to the right of the center of the path, and a number of buildings were torn to pieces. The value of property destroyed at Pachuta was placed at \$12,000 to \$15,000. A heavy thunder and hail storm moved northeast in a path $\frac{1}{2}$ to $\frac{1}{4}$ mile in width near Cuba, Sumter County, Ala., about 6.30 p. m., killing one person and leveling timber. About 7 p. m. a storm passed eastward in a path 250 to 300 yards in width through a sparsely settled district, 10 miles from Butler, Choctaw County, Ala., with heavy rain before, small hail, sheet lightning, and some thunder.

At Montgomery, Ala., a thunderstorm approached from the northwest at 8.38 p. m. (75th meridian time). From 8.40 to 9.50 p. m. the lightning was incessant and there was a continuous rumble of thunder. Hail fell at 9.05 p. m., some of the hailstones being one-half inch in diameter and irregular in shape; a second fall of hail occurred from 9.41 to 9.44 p. m. At 9.45 p. m. the wind reached a velocity of 41 miles per hour from the northwest. The storm was very severe north of Montgomery. At Tuscaloosa, Ala., a heavy thunder and hail storm moved southeast at 5.45 p. m.; a number of buildings were blown down. A severe storm passed south of Lagrange, Troup County, Ga., at 8.30 p. m., injuring a number of persons, and destroying many buildings. The electrical

display was brilliant and the thunder continuous and heavy. One observer at that point reported a funnel-shaped cloud, and what appeared a ball of fire. This storm apparently followed an almost due east course across Troup, Meriwether, and Pike counties, Ga., a distance of more than 60 miles, at an average velocity of about 42 miles per hour.

A severe thunderstorm passed Hogansville, Troup County, Ga., at 8.30 p. m., without causing material damage. At Odessa, Meriwether County, Ga., 6 persons were killed, and 3 houses, only, were left standing. At Woodbury, Meriwether County, 2 persons were killed. At that place heavy rain, a straight wind, thunder, lightning, and hail were reported. At Greenville, Meriwether County, the path of destruction was about one-quarter mile in width, and the storm was attended by incessant thunder and lightning, large hail, and heavy rain. At that point one person was killed and 74 buildings were wrecked; the aggregate value of property destroyed was placed at \$150,000. At Molena, Pike County, Ga., a thunderstorm moved east in a path about $\frac{1}{2}$ mile in width at 8.50 p. m., killing one person and destroying property to the value of about \$7,000.

At Piedmont, Pike County, Ga., a thunder, rain, and hail storm moved east with a whirling motion in a path $\frac{1}{2}$ mile in width at 9 p. m., killing 1 person, injuring 30, and destroying or damaging a large number of houses. One person was reported killed near Barnesville, Pike County. A violent storm passed through the southern edge of Forsyth, Monroe County, Ga., at 10 p. m., destroying about 20 houses. The storm was attended by very brilliant, incessant lightning. At 9 p. m. a violent, whirling storm, with thunder, lightning, and heavy rain moved east at The Rock, Upson County, Ga., in a path $\frac{1}{2}$ to $\frac{3}{4}$ mile in width. A number of persons were reported killed, and many were injured. Within a distance of 6 miles 75 to 100 houses, mostly outbuildings, were destroyed, and many large trees were broken off 10 to 12 feet above the ground. At Albany, Dougherty County, Ga., a heavy thunderstorm prevailed from 11 p. m., 3d, to 3 a. m., 4th. At Atlanta, Ga., a thunderstorm from the southwest prevailed from 8.30 to 9.45 p. m. (75th meridian time).

During high wind and dense fog a steamer went ashore on the outer beach of Santa Rosa Island, near Pensacola, Fla.; salvage expenses amounted to about \$6,000. At Jacksonville, Fla., a southwest gale began in the evening and continued during the 4th, with maximum velocity 48 miles per hour at 1.35 a. m., 4th. At Charleston, S. C., a thunderstorm began 10.40 p. m., 3d, and ended 4.10 a. m., 4th, with light rain, and high west to northwest winds. At Springfield, Mo., light rain, with rapidly falling temperature, some thunder, and northeast wind, prevailed until 10.40 a. m., when the rain changed to heavy snow. Snow continued during the day, the total depth being 4 inches, and high northeast changing to northwest winds prevailed in the afternoon. A blinding snowstorm, with high northwest wind and rapidly falling temperature, prevailed at Laconia, Ind.

4th.—At Titusville, Fla., the wind veered from south to west in the early morning and continued high until evening. A northwest gale, with snow from 7.30 to 8.55 a. m., prevailed at Montgomery, Ala., in the morning. At Port Royal, S. C., a violent thunderstorm at 2 a. m. was followed by a west gale which continued all day. A thunderstorm, with rain, occurred in the early morning at Hatteras, N. C. Snow fell from 2.30 to 3.15 p. m., and from 6.35 to 7 p. m., with a northerly gale. A schooner stranded on the beach 1 mile north of the station at 3 p. m. At Wilmington, N. C., rain and a moderate thunderstorm from the southwest began 12.10 a. m., and ended during the early morning. The wind veered from southwest to northwest and increased in force, reaching a velocity of 48 miles per hour at 1.25 p. m. Rain began 9.50 a. m., attended by snow for about 10 minutes. At Norfolk, Va., rain

changed to heavy snow 9.26 a. m., and snow ended 4.10 p. m., with a heavy northwest gale. At Cape Henry, Va., the wind reached a velocity of 64 miles per hour from the northwest at 5.32 p. m., and at intervals during the day reached 60 miles per hour. Light rain changed to snow 10.30 a. m.; snow changed to rain at 3 p. m.; and the rain ended 4.20 p. m. At Lynchburg, Va., rain changed to heavy snow 6.50 a. m., and snow ended 11.25 a. m., with high west to north winds. High northwest wind and heavy snow prevailed in the afternoon and evening at Atlantic City, N. J.

7th.—A light hailstorm occurred at Devine, Tex. Eight miles southeast of Devine considerable damage was caused by hail. A severe wind and rain storm was reported at Winnsboro, La.

8th.—High wind at night caused some damage about Shelbyville, Ky. At 3 p. m. a thunderstorm, with heavy rain, moved northeast over Vincennes, Ind., causing damage of a minor character. About 4.35 p. m. a storm which seemed to barely touch the roofs of houses moved northeastward over Brooklyn, Ind.; no thunder was heard; heavy rain fell after the passage of the storm. Several houses were reported prostrated during a storm at Princeton, Ind. At Olney, Ill., several buildings were wrecked by a storm which advanced from the southwest.

9th.—Heavy rain flooded streets at New London, Conn. Considerable damage was caused by heavy rain and flood about South Canisteo, N. Y. Excessive rainfall caused a freshet in the Raritan River, N. J. During a southwest gale a schooner was wrecked near Ocracoke, N. C.

10th.—A thunderstorm, with high wind, was reported at Austin, Tenn., at night. Heavy rain the night of the 10th caused damage about Water Valley, Miss.

11th.—At Fresno, Cal., light rain fell all day, and heavy snow was reported in the mountains; a heavy hailstorm was reported on the west side of the valley. A southeast gale prevailed at Red Bluff, Cal., in the early morning.

13th.—High wind, with snow, prevailed over Minnesota, northern Wisconsin, and Upper Michigan; snow interrupted railroad traffic.

14th.—Heavy thunder and rain storms were reported at night in Connecticut; at Manchester, Conn., lightning struck five times, and telegraphic communication between New Haven and Hartford was interrupted. The early morning of the 15th a church in North Middleboro, Mass., was struck by lightning. In the evening a barn was struck by lightning and burned at Cold Spring, N. J.

17th.—At Saint Petersburg, Fla., a small house was struck by lightning and burned.

22d.—At Toledo, Ohio, sleet fell at intervals in the morning, and rain continued all day, with high southeast wind. In the evening rain froze as it fell, interrupting telegraphic communication. At Valley Junction, Wis., heavy sleet attended a thunderstorm at night. At Oklahoma City, Okla., a disturbance was observed in the upper atmosphere at 7 p. m. The wind, which had been blowing from the south at a velocity of 25 miles per hour, veered to west for 15 minutes and then shifted rapidly to the various points of the compass. From 7 to 7.30 p. m. the clouds in the west assumed a greenish hue, became very dense, and had the white fringe peculiar to hailstorm clouds. At 10 p. m. the tornado moved northeast over the city, the path being about $\frac{1}{4}$ mile from the Weather Bureau office. The storm cloud presented the appearance of an inverted funnel. The lower end of the funnel-shaped cloud swung from side to side, and at times descended to the earth. The cloud had a whirling motion, and was attended by a sullen, grinding noise. Heavy rain, with thunder and lightning, fell from 10.15 to 11.10 p. m. One person was seriously injured, and 14 buildings, valued at \$15,000, were destroyed. At the Weather Bureau office the

wind reached a velocity of 60 miles per hour. An observer about 3 miles northeast of Oklahoma noted three funnel-shaped clouds as the storm approached. When the storm struck he was thrown to the ground, and darkness prevented further observation until after the disturbance had passed. The path of destruction through the city of Oklahoma was 50 feet to 50 yards in width. Some houses were twisted and others had one end torn off. Debris in the center of the path lay in a confused heap; articles in the south part of the track were twisted in toward the center, and debris was scattered 4 miles south of the path. Buildings on the north edge of the path seemed pressed toward the center. A heavy southwest gale prevailed during the day and at night at Amarillo, Tex. A heavy windstorm overturned small building at Brownwood, Tex.

23d.—Severe local storms occurred in the evening from Arkansas, northern Louisiana, and northern Mississippi over western Kentucky and southern and central Indiana. At Crawfordville, Ark., a severe storm, with thunder, lightning, and rain, moved northeast in a path $\frac{1}{2}$ to $\frac{1}{4}$ mile in width at 3 p. m., destroying and damaging buildings to the extent of about \$10,000. A destructive storm moved northeast through a sparsely settled district between Mangham and Archibald, La., about 2.30 p. m.; several persons were reported killed, and a number of buildings were destroyed. A storm moved northeast through a thinly settled district, $1\frac{1}{2}$ mile north of Shubuta, Miss., at 3 p. m., with heavy rain and vivid lightning, killing 3 persons and fatally injuring one. Prostrated trees showed a right to left whirling motion.

A thunder and hail storm moved northeast over Kelly, Miss., at 4 p. m.; the path of destruction was $\frac{1}{2}$ mile in width; several persons were reported killed, and the loss of property in that section was placed at \$150,000. At Shaw, Miss., a heavy thunder and rain storm moved northeast in a path about 500 feet in width at 4 p. m., without causing material damage. A thunderstorm, with rain and some hail, moved northeast over Cleveland, Miss., at 4 p. m. A heavy thunder, rain, and hail storm passed northeast over Renova, Miss., about 4.30 p. m. At Palo Alto, Miss., a southwest gale at 4 p. m. caused damage of a minor character, and from 7 to 11 p. m. a thunderstorm from the southwest prevailed. A thunderstorm, with light rain, moved northeast near Jackson, Tenn., at 5 p. m. At 5.15 p. m. a thunderstorm, with hail before and rain after, moved northeast 2 miles southwest of Spring Creek, Tenn., blowing down trees and damaging buildings in a path about $\frac{1}{2}$ mile in width.

A heavy rainstorm, with some thunder and lightning, moved northeast over Dresden, Tenn., about 5.30 p. m. A thunder and rain storm from the southwest visited Luray, Tenn., at 7.30 p. m. About 15 miles west of Luray, buildings were destroyed and 2 persons were injured. Considerable damage of a minor character was caused by a thunder, rain, and hail storm which visited Gallatin, Tenn., about 7.30 p. m. At Nashville, Tenn., a thunderstorm began 8.15 p. m. (75th meridian time), and continued until the early morning of the 24th. The wind, which had been high from the southeast, veered to southwest at 9 p. m., and at 9.15 p. m. reached a velocity of 42 miles per hour. The rainfall was heavy, and small hail fell from 8.30 to 8.35 p. m. In the northern portion of Nashville 15 to 20 buildings were demolished, one person was killed, and many were injured. A thunderstorm moved northeast over Clarksville, Tenn., at 8.30 p. m., unroofing a number of buildings.

A severe thunder and rain storm passed northeast over Murray, Ky., at 5.50 p. m.; an infant was injured, and property to the estimated value of \$30,000 was destroyed. A small, dark, smoky-looking column attended the passage of the storm at Murray. At Henderson, Ky., a thunder, rain, and hail storm moved northeast in a path about 200 yards in

width at 6.45 p. m., damaging property to the estimated value of \$75,000. At 7.15 p. m. heavy thunderstorms were reported at Pembroke and Guthrie, Ky. Tobacco barns 12 miles west of Guthrie were blown down. A thunder and rain storm, with hail, passed northeast over Bowling Green, Ky., at 7.30 p. m., damaging buildings, etc., to the extent of about \$20,000. At Louisville, Ky., rain, attended by a violent thunderstorm, began 7.58 and ended 11 p. m. (75th meridian time). A light thunderstorm passed northeast at Hopkinsville, Ky., at 9.30 p. m. At Lexington, Ky., a thunderstorm began 10.15 p. m. (75th meridian time), and ended the early morning of the 24th; a barn was struck by lightning and burned.

A light thunderstorm, with heavy rain, visited Danville, Ky., between 10 and 11 p. m. A thunder and hail storm moved northeast over Rowland, Ky., at 11.30 p. m. in a path about 300 feet in width, destroying property to the value of \$10,000. At Mount Vernon, Ind., a heavy thunderstorm continued 2 hours, causing damage of a minor character. A thunderstorm, with hail, visited Evansville, Ind., at 6.30 p. m.; considerable damage was caused by heavy rain. At 6.40 p. m. a destructive storm moved in a northerly direction over Chandler, Ind., with heavy thunder, lightning, rain, and hail. The storm apparently had two paths, one west and the other east of Chandler. Within 4 miles of that place 2 persons were injured, one fatally, and one church, 4 residences, and 10 barns were destroyed. At 7 p. m. a thunderstorm moved northeast over Loogootee, Ind.; 2 buildings were damaged by wind. A destructive storm occurred one-half mile from Huntingburg, Ind., at 7 p. m. A severe thunderstorm, with moderate rain and hail, visited Boonville, Ind., about 7 p. m.

At 7.30 p. m. a thunderstorm, with heavy rain and small hail, moved northeast over Bedford, Ind., destroying and damaging buildings to the extent of \$30,000. A thunderstorm passed northeast over McCordsville, Ind., at 8.30 p. m.; within a radius of 15 miles property was damaged to the estimated value of \$10,000. A heavy thunder, rain, and hail storm moved northeast over Mooresville, Ind., at 8.30 p. m.; considerable damage was caused in that section. At Brooklyn, Ind., the loss to property was estimated at \$5,000. A thunder and rain storm moved northeast over Alexandria, Ind., at 9 p. m.; one person was killed, and a building was damaged to the extent of \$3,000. A severe thunder, rain, and hail storm moved northward over Greenwood, Ind., at 9 p. m.

A thunderstorm from the southwest reached Indianapolis, Ind., at 9.11 p. m., and ended at that place 10.07 p. m. (75th meridian time). Heavy rain fell from 9.28 to 9.48 p. m., and light rain continued until the early morning of the 24th. The storm was destructive in the northwest suburbs of Indianapolis, where a squall of wind from the southwest wrecked a number of frail buildings, damaged others, and broke or uprooted 30 to 40 trees in a path about 250 yards in width. Some damage was caused by a thunderstorm at Leipsic, Ohio. At Bronson, Mich., a heavy thunderstorm, with heavy rain, began 6 p. m., 23d, and continued until the morning of the 24th. A thunderstorm, with high wind, damaged buildings at Carrollton, Mo. At Plover, Wis., a building was struck by lightning and burned. A heavy snowstorm, with high wind, extended from the Dakotas over Minnesota. At Red Wing, Minn., a thunderstorm, with sleet, occurred in the evening.

24th.—A heavy rain and thunder storm damaged fields and roads about Fitchburg, Mich. A severe thunder, rain, and hail storm moved east 3 miles south of Vossburg, Miss.

25th.—At Titusville, Fla., a thunderstorm was observed approaching from the northwest in the afternoon. Light rain fell from 4.10 to 4.15 p. m. At 5 p. m. the wind shifted from southeast to north, and in 10 minutes increased from

12 to 46 miles per hour. The gale continued until 6.30 p. m. A second thunderstorm, with rain, prevailed from 5.55 to 7.30 p. m.

26th.—An exceptionally severe thunderstorm from the southwest prevailed at Jupiter, Fla., from 6.32 to 7.05 p. m.; 2.95 inches of rain fell in 33 minutes. At Titusville, Fla., a thunderstorm from the northwest occurred in the morning,

and heavy rain and wind squalls occurred at intervals until 11 p. m.

27th.—During a thunder and hail storm in the afternoon at Emporium, Kans., a barn was struck by lightning and a horse killed. A hailstorm was reported about 5 p. m. 3 miles southwest of Rome, Kans.; several outbuildings were destroyed.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence; and the monthly ranges:

Heights of rivers above low-water mark, March, 1893.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>						
Shreveport, La.	29.9	20.7	25-27	15.0	7	5.7
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	12.1	11	3.5	27	8.6
Little Rock, Ark.	23.0	16.9	11	8.3	23	8.6
<i>Missouri River.</i>						
Fort Buford, N. Dak. *	.....	.....	.....	.....	.....	.....
Pierre, S. Dak.	14.0	.....	.....	.....	.....	.....
Sioux City, Iowa. †	18.7	14.0	12	3.4	17, 18	10.6
Kansas City, Mo.	21.0	14.2	16	6.0	1	8.2
<i>Mississippi River.</i>						
Saint Paul, Minn. *	14.0	.....	.....	.....	.....	.....
La Crosse, Wis.	11.8	.....	.....	.....	.....	.....
Dubuque, Iowa.	16.0	.....	.....	.....	.....	.....
Davenport, Iowa. †	15.0	13.1	13	5.8	22, 23, 30, 31	7.3
Keokuk, Iowa.	14.0	13.3	17	8.1	31	5.2
Hannibal, Mo.	17.0	13.7	19	4.5	8	9.2
Saint Louis, Mo.	30.0	22.1	19, 20	12.0	1	10.1
Cairo, Ill.	40.0	44.9	1	28.6	10	16.3
Memphis, Tenn.	33.0	33.1	3	24.1	13, 14	9.0
Vicksburg, Miss.	41.0	42.4	13-15	38.3	1	4.1
New Orleans, La.	13.0	13.9	18-21, 27	12.8	1	1.1
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	26.1	14	9.0	23	17.1
Cincinnati, Ohio.	45.0	36.9	16, 17	18.8	27	18.1
Louisville, Ky.	24.0	12.7	17	7.9	28	4.8
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	24.0	15	7.7	26	16.3
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	12.0	14	5.7	31	6.3
Knoxville, Tenn.	29.0	6.5	12	2.5	23, 26	4.0
<i>Monongahela River.</i>						
Pittsburg, Pa.	29.0	16.6	13	5.5	8	11.1
<i>Savannah River.</i>						
Augusta, Ga.	32.0	21.0	1	8.0	23, 24, 31	13.0
<i>Willamette River.</i>						
Portland, Oregon.	15.0	6.0	31	2.4	15	3.6
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0	14.6	14	2.5	6, 7	12.1
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	19.5	5	6.6	23, 24, 31	12.9
<i>James River.</i>						
Lynchburg, Va. ....	.....	4.0	5	1.1	29-31	2.9
<i>Sacramento River.</i>						
Red Bluff, Cal. ....	.....	18.6	11	4.2	2	14.4
Sacramento, Cal. ....	.....	26.5	22	20.0	8	6.5

* River frozen. † For 20 days. ‡ For 19 days. § For 23 days.

ICE IN RIVERS AND HARBORS AND OPENING OF NAVIGATION.

Navigation opened on the Connecticut River between Hartford and Saybrook on the 14th.

Hudson.—Ice opposite Albany moved down the night of the 12th, and the river rose rapidly from 3 a. m. to 12.30 p. m., 13th, at which time the gorge which had formed below the city, gave way. During the 14th the river continued high at Albany, and the ice was firmly gorged and piled to a depth of 20 to 30 feet on the overslaugh. The river was reported open from Newburg to New York on the 13th, and from New York to Poughkeepsie on the 17th. The afternoon of the 13th an ice gorge in the creek above Rondout, N. Y., broke and carried 35 boats into the Hudson River, where a number were sunk and others damaged. On the 15th the river was high and the ice firm between Coeymans and Sing Sing. On the 23d the river opened at Albany and closed between Castleton and Poughkeepsie. Heavy ice was running in the river at Albany

on the 24th. On the 25th the ice gorge below Albany moved, and the river was reported clear to New York. On the 31st the first through boat of the season, the steamer "Dean Richmond," arrived at Albany from New York.

Floods, caused by ice gorges, occurred in the smaller rivers and streams of New York and Pennsylvania. On the 10th ice was running in the Genesee River at Rochester, N. Y. The West Branch of the Susquehanna River was frozen at Lock Haven, Pa., on the 1st; 9th, ice moving; 13th, slush ice running. Ice passed out of the Susquehanna River at Wilkesbarre, Pa., on the 10th; 13th, river rising, with large quantities of floating ice. Steamboats resumed their trips on the Delaware River at Beverly, N. J., on the 1st. At Selins Grove, Pa., the river was full of floating ice and drift on the 13th. At Towanda, Pa., running ice was noted on the 10th, 12th, and 13th. On the 10th heavy ice passed down the Raritan River at New Brunswick, N. J. Heavy ice gorges were reported in the Maumee River, Ohio. Ice passed out of the Illinois and Fox rivers at Ottawa, Ill., on the 8th. Ice passed out of the Illinois River at Hennepin, Ill., on the 8th, and at Havana, Ill., on the 9th. On the 12th the first boat of the season passed Havana. On the 9th and 10th ice passed out of the Fox River at Oswego, Ill. Ice gorges flooded streams in Michigan, Wisconsin, and Nebraska. Ice broke up in the Rock River at Beloit, Wis., on the 11th. Ice began to break up in the Des Moines River at Des Moines, Iowa, on the 10th; the river was almost clear of ice at that point on the 18th. Ice broke up in the Cedar River at Cedar Rapids, Iowa, on the 13th. Ice broke up in the Loup River near Genoa, Nebr., on the 10th, damaging many bridges. The Little Missouri River opened at Medora and Yule, N. Dak., on the 28th. Ice began to run out of the Powder River at Powder River, Mont., on the 26th. At Miles City, Mont., ice in the Tongue River broke up on the 27th. Ice broke up in the Yellowstone River at Glendive, Mont., on the 28th.

Mississippi River.—At the close of the month the river was open near each bank at Red Wing, Minn.; in mid-stream the ice was solid. At Dubuque, Iowa, ice broke up below the bridge and gorged at the bend on the 13th; 20th, ice above the bridge broke; 23d, river clear of ice; 25th, navigation resumed. At Davenport, Iowa, the ice began to break up on the 12th; 13th, ice moved out at 10 a. m., but gorged below the city, and the river rose rapidly; at Rock Island, Ill. (opposite Davenport), considerable damage was caused by ice; 14th, first steamer of the season passed down the river; 15-17th, river full of floating ice; 27th, several steamers from up and down the river arrived, and navigation opened. The first steamer of the season passed down the river at Keokuk, Iowa, on the 20th. The first up-river boat of the season passed Hannibal, Mo., on the 14th.

Missouri River.—Ice from the Yellowstone River caused a rise in the Missouri River of 10 to 12 feet at Fort Buford, N. Dak., on the 30th. On the 29th ice began to run out in a narrow channel on the west side of the river at Yankton, S. Dak. Ice broke up near Santee Agency, Nebr., on the 9th. At Sioux City, Iowa, ice ran out on the 12th; running ice was noted from the 13th to the 15th. At Leavenworth, Kans.,